

North American Technology and Industrial Base Organization (NATIBO)



Technology and Industrial Base Sector Studies January 1995 to Present

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TECHNOLOGY AND INDUSTRIAL BASE SECTOR STUDIES

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TECHNOLOGY AND INDUSTRIAL BASE SECTOR STUDIES

FOREWORD

This publication is a compilation of technology and industrial base sector studies published or made available between January 1995 and the present. Included are studies by the military services and civilian government agencies. For each study, a brief abstract is provided, along with the date of the report, the sponsor or originating agency, and where it can be obtained. The NATIBO does not service or provide copies of the studies. If you are interested in obtaining a copy of a study, refer to the originating agency or distribution information for each study. Limitations on availability are noted in the distribution statement and are controlled by the originating agency.

National Systems Management Corporation prepared this guide for the North American Technology and Industrial Base Organization (NATIBO), whose mandate is to promote activities by government and industry that support and develop the North American technology and industrial base. The purpose of this publication is to foster the exchange of information concerning various sectors of the industrial base between the U.S. military services and civilian agencies and their Canadian counterparts.

Industrial base sectors can be viewed either horizontally -- by looking at business entities that produce common items, such as advanced materials; or vertically -- by looking at entities that contribute at varying levels to the production of an end item or system, such as a tactical wheeled vehicle. This document contains study reports that cover industrial base issues from both perspectives, some covering an entire military or civilian industry that contributes to the health of the industrial base and the economy, and some focused on a specific defense-related requirement. However, this publication should not be considered all-inclusive; rather, it should be viewed as an indicator of the data that is available, much of it on the worldwide web.

The information in this document is being made available on the internet via the NATIBO web site, www.dtic.mil/natibo. Other study report abstracts will be added to the site approximately every six months. Contributions of information that will enable the NATIBO to enhance and enlarge this collection of technology and industrial base studies are welcome. Please provide the information requested on the attached form and forward to Mrs. Nancy Hoesly, U.S. Army Materiel Systems Analysis Activity, ATTN: AMXSY-LS, Rock Island, IL 61299-7260. Mrs. Hoesly can be reached by E-mail at nhoesl@ria-emh2.army.mil; or by FAX at (309) 782-7170.

TECHNOLOGY AND INDUSTRIAL BASE SECTOR STUDIES

Technology and Industrial Base Sector Study

Title of Study	
Publication Date	
Originating Agency	
Distribution Point of Contact	
Distribution Limitation	

Abstract of Study:

TECHNOLOGY AND INDUSTRIAL BASE SECTOR STUDIES

Aerospace Gear Industry Analysis

Date: March 1995

Originating Agency: Wright Laboratory
MTAP
Wright-Paterson AFB , Ohio 45433-7739
Contract No. F33615-93-D-5101, Delivery Order-0003

Distribution Limitatiion: For Official use Only; Proprietary Information

Abstract:

This report reviewed and analyzed the current state of the aerospace gear industry based on a sample of 18 key suppliers. The goal was to provide a snapshot of the state of the gear industry, relate its condition to ongoing needs of defense programs, and identify trends that will affect the industry's viability. The report found that gears are an integral part of every aerospace program and that crucial elements of the industry were at risk. Specialized materials used in a variety of gears required exacting specifications and surface modification processes. Within this small industry, nearly every company had undergone significant reductions in force, some up to 75 percent, and a number of suppliers have been bought out or merged during the past fifteen years. Sales industry wide have plummeted, forcing progressive companies to search for new opportunities. Unfortunately, those companies are forced to hold on to a significant amount of unused manufacturing capacity and capital equipment.

Significant risk factors for the future of the industry include this excess capacity, a declining or diminishing customer base, a trend toward foreign competition and the fact that a few of the managers in the industry have assumed a "death watch" mentality. The report predicted a major shakeout in the industry and increased demand for the few remaining suppliers. It suggested that the DOD list, track, and periodically review the status of the aerospace gear industry to ensure that it does not erode to a level from which it cannot be revived.

Aircraft Industry Study Report 1996

Date: 1996

Originating Agency: Industrial College of the Armed Forces
National Defense University
Washington, DC

Distribution: <http://www.ndu.edu/ndu/icaf/isair.html>

Abstract:

The study team assessed the global competitiveness of the U.S. aircraft industry in four major sectors: commercial transport, military fixed-wing aircraft, civil and military helicopters, and aircraft engines. Within these sectors, three key subsectors were examined: design and integration, advanced materials, and avionics/flight controls.

As one of the largest earners of export dollars in the economy, the U.S. aircraft industry is clearly a nationally important strategic industry. However, while buying cycles in the commercial and military segments formerly offset each other, since the end of the Cold War, spending in both sectors has declined. Fewer sales and lower production have forced manufacturers to restructure and downsize their operations, including a massive reduction in the skilled work force. Surge capability is still available, but the average time to produce significantly more aircraft is estimated at two years.

Despite the worldwide aircraft industry downturn, most manufacturers look forward to a positive future because of the aging military and commercial fleets. However, to retain their current 60% market share, U.S. companies will have to focus monetary and managerial resources on some key areas: computer-based design, integration, configuration control, and manufacturing; flexible manufacturing for efficiently producing multiple products at low volume; marketing methods that demonstrate advanced concepts; and increased customer orientation.

Continued support from the government and changes in some government policies could help ensure the success of the aircraft industry: continued support of the dual-use approach that merges civil and military practices in technologies critical to both defense and commercial enterprises; providing incentives for investing in high-technology facilities and advanced manufacturing equipment; partnering to develop programs that produce skilled, knowledgeable workers; reforming regulations and acquisition policies that impose unnecessary and costly procedures and restrictions on contractors; streamlining acquisition by adopting the best commercial procurement and accounting practices; rewarding pioneering companies by adopting their products, processes, and commercial standards; providing tax incentives for greater capital investment; and reforming tax laws to shorten depreciation cycles to reflect rapidly decreasing capital equipment life cycles.

Industrial Base Assessment of the Military Strategic and Tactical Relay System (MILSTAR)

Date: May 1995

Originating Agency: Wright Laboratory
MTA
Wright-Patterson Air Force Base, Ohio 45433-6503

Distribution Limitation: For Official Use Only; Proprietary Information

Abstract:

The 1993 Satellite Systems Technical Analysis (SSTA) Final Report presents the results of an analysis of the status of key contractors that supply the Space and Missile Center's (SMC) Military Strategic and Tactical Relay (MILSTAR) program. Twenty-four site visits were conducted. The report noted that senior government managers will face tough decisions in allocating research funds over the next four years. One area that requires close oversight is research and development in advanced materials for satellite structures because a primary research center for beryllium applications has been severely cut back. Also, recent cuts in defense spending have had a significant negative effect on the satellite industrial base. A number of companies have felt the pressures of reduced orders, longer periods between orders, and the fear of project terminations. In addition, the negative publicity about defense program cutbacks have undermined manufacturers' confidence in the potential for future business. Some weak companies have gone out of business and some healthy companies are terminating DOD product lines.

This report recommended that the program office address (1) issues involving each potentially high- and medium-risk company; (2) encourage the primes to improve their awareness of lower tier issues; (3) review their low-volume requirements and make life cycle procurements on potentially obsolete parts which are key to future launches. Further, the report recommended that SMC/SDFM assist the Air Force in raising industrial base issues involving EPA, the Government procurement process, and payment intervals to the appropriate DOD level for solution. The sample of companies in this survey is a small percentage of the total number of companies and people involved in production of the MILSTAR satellite system. However, the issues identified by these companies are representative of the problems facing other defense contractors.

TECHNOLOGY AND INDUSTRIAL BASE SECTOR STUDIES

Industrial Base Survey of the Military Strategic and Tactical Relay System (MILSTAR) Satellite Program

Date: October 1995

Originating Agency: Space and Missile Systems Center/SDF
160 Skynet Street, Suite 2315
Los Angeles Air Force Base, CA 90245-4683

Distribution Limitation: For Official Use Only; Proprietary Information

Abstract:

This report of 163 company evaluations, commissioned by the Systems Effectiveness Division of the MILSATCOM Systems Program Office was designed to provide a window into the current environment and state of health of the defense industrial base which provides support to the MILSTAR program and systems. Of the 181 suppliers identified as manufacturers and contacted as a part of this assessment, 17 were out of business or no longer producing MILSTAR products. Fifty-three on-site visits were conducted.

The information gathered during the study indicates there are varying degrees of risk to the program. The reasons most often expressed for decreasing support to defense programs, or described as causing problems in producing MILSTAR, were excessive paperwork, diminishing sources, business and economic climate concerns, defense cutbacks and insufficient business volume, increasing lead times, low profits which do not justify support to military programs, and moves and major relocations

The report concluded that shifts and changes in the industrial base are occurring much more rapidly as the military budget erodes. Recommendations for ensuring a viable industrial base at this juncture must be general in nature, but specific recommendations may be obtained directly from the supplier base through an open and ongoing dialogue. Policy recommendations and production impediments must be surfaced, analyzed, and corrected. The only mechanism capable of removing these obstacles is open and ongoing communication throughout the supplier base, to include the very lowest levels.

Lower Tiers of the Space Transportation Industrial Base

Date: August 1995

Originating Agency: Congress of the United States
Office of Technology Assessment (Defunct)
OTA-BP-ISS-161

Distribution: General Printing Office
GPO Stock No. 052-003-01425-4

Abstract:

Although a number of studies have assessed the viability of the space transportation technology and industrial base, they have focused on the large prime contractors that integrate and assemble space transportation systems. The studies have all but ignored the lower tiers of this base -- the firms that supply most of the subsystems, components, and parts -- despite the fact that these firms collectively account for roughly half of the value added to such systems. These firms are feeling disproportionate pain from defense cuts, but are largely overlooked by policymakers. The assessment produced these findings:

- Although some firms have significant nongovernment business that enables them to survive the decline of their government launch vehicle and missile work, many lower tier manufacturers are not diversified and depend heavily on the launch vehicle, missile, and related military markets. These firms share a pessimistic view of their future business prospects.
- Lower tier firms are unwilling to fund R&D unless the resulting product has dual-use potential.
- Attrition is high among lower tier firms, meaning that new suppliers may have to be found within 5 years for up to 40 percent of critical subsystems and components.
- Lower tier liquid fuel propulsion firms believe they will bear the brunt of any decision to incorporate Russian or other foreign technology in U.S. space systems.
- More and more launch vehicle subsystems and components are produced by only one or two suppliers. This industry consolidation may result in lower costs, or it may cause delays, unexpected future expense, or reliability concerns if even one supplier fails or withdraws. Furthermore, unique capabilities may be lost.
- Loss of experienced workers and limited intake of young engineers and specialists are eroding the industry's knowledge base.
- Lower tier firms have not benefited from procurement reforms, and continuation of traditional practices directly deters efforts to diversify into commercial markets.
- Relations between lower tier firms and prime contractors are strained. As the primes downsize they tend to compete with their suppliers for federal R&D funds and to do all of the work in house.

MICOM Spare and Repair Parts Item Manager Report

Date: September 1995

Originating Agency: Industrial Operations Division
(AMSMI-RD-SE-IO)
US Army Missile Command
Redstone Arsenal, AL

Distribution Limitation: For Official Use Only

Abstract:

This report, commissioned by the Industrial Operations Division of the U.S. Army Missile Command, Redstone Arsenal, Alabama, was designed to provide a window into the current environment and state of health of the defense industrial base which provides support to MICOM programs and systems. The report found that the industrial base is under significant strain, in terms of overall capacity and the decreased capability to respond to the immediate threat to the national security interests of the United States. This study found that 30,199 line items in the MICAPP database were produced by 1,797 manufacturers. Because the focus of the study was intended to be third-tier and lower suppliers, 244 prime and upper tier suppliers were deleted from the list of 1,797 manufacturers for the purposes of the study. Of the remaining 1,553 suppliers contacted as a part of this assessment, 143 were out of business. Those companies produced a total of 929 line items, 132 of them single source. Another 95 companies declined, for a variety of reasons, to continue to produce 445 parts for MICOM programs. Those companies were the only listed sources for 60 parts. The following reasons were most often given for terminating support to defense programs, or causing production problems with regard to providing support to MICOM: defense cutbacks, insufficient business volume, excessive paperwork, Government practices, uncertainty, program cancellations, no visibility into government needs; military specifications and standards requirements, Government communications, uneven competition, and inadequate profitability. It is worth noting that six of the citations of government practices were explicit in references to slow and late payments by the Government. It is also notable that 10 of the 14 citations of poor Government communications pointed directly to slow, or no, response to queries and phone calls not returned. Voice mail used by the government was the target of particular resentment by frustrated contractors. The report concluded that, while large issues such as the cutbacks in the Defense budget may be beyond the control of MICOM or an Item Manager, prompt processing of payments and returning suppliers' calls should be achievable goals to improve the environment in which contractors operate.

**National Security Assessment of the Emergency
Aircraft Ejection Seat Sector**

Date: 1996-97 edition

Originating Agency: U.S. Air Force

Distribution: The Association for Manufacturing Technology,
(703)827-1204

Abstract:

This assessment was conducted at the request of the U.S. Department of the Air Force. It studies the anticipated requirements for ejection seats over the next several years and the potential impact that these requirements will have on the domestic capability for designing and producing ejection seats. The study was conducted in cooperation with ejection seat producers in Russia and the United Kingdom. It provides recommendations regarding the consolidation of the U.S. industry, development of the next generation seat technology, and U.S. involvement in international markets.

TECHNOLOGY AND INDUSTRIAL BASE SECTOR STUDIES

Organic Industrial Base Lower Tier Analysis for Aircraft

Date: March 1996

Originating Agency: Wright Laboratory
MTA
Wright-Patterson AFB, OH 45433-6503

Distribution Limitation: For Official Use Only; Proprietary Information

Abstract:

Information on 160 companies is included in this study. Of the 124 companies reporting sales data, 70 reported less than \$10M annually; 34 reported \$10M to \$50M per year; and 20 had more than \$50M. Eighteen reported a decrease in sales, averaging 21 percent. Of the 123 companies which broke down their sales data between military and commercial, military sales accounted for an average of 48 percent. Forty-six companies reported suffering a reduction in force in the past three years. Of the companies visited, 97 reported percentage of facility capacity utilized. Twenty-four are using less than 50 percent; 43 use 50-80 percent; and only 30 companies utilize more than 80 percent. It should be noted that judgments can only be drawn from the data provided by the companies visited. Extrapolation of those data to the entire production base supporting the Air Logistics Commands cannot be sustained by logic. This is because data provided by the companies surveyed cannot be quantified in terms of effect on production and sustainment, unless all other suppliers capable of producing an equally acceptable part or component are known. The study recommended the establishment of a centralized process or organization to conduct and coordinate similar study efforts, utilizing state of the art technologies and communications networks, such as an Internet Homepage.

Small Tactical Terminal Subcontractor Survey

Date: May 1995

Originating Agency: Space and Missile Systems Center/SDF
160 Skynet Street, Suite 2315
Los Angeles Air Force Base, CA 90245-4683

Distribution Limitation: For Official Use Only; Proprietary Information

Abstract:

This report summarizes the results of a limited, but focused examination of the subcontractor base supporting Harris Corporation in the production of the Small Tactical Terminal (STT), which is being built to provide a deployable terminal capable of providing field commanders with Defense Meteorological Satellite Program (DMSP) information. The report noted that approximately fifteen percent of the suppliers to STT may not meet delivery schedules over the next five years; reduced order quantities will impact the acquisition process; suppliers are assigning lower priorities to lower profit contracts; there is a decreasing interest in responding to federal requests for quote; there is currently an erosion in the number of electronic part and component makers; and, the market for raw materials and specialized parts is unstable. This results in unpredictability of costs and makes scheduling problematic. To mitigate the risk to mission success that could result from nonperformance by any one of the medium risk subcontractors (15%), the report recommended that future industrial base analysis be performed far enough in advance to allow the products that are found to be medium risk to be treated as long-lead items, or second sources be identified for medium risk subcontractors, and/or the industrial base be continually monitored to maintain cognizance of medium risk vendors and to identify other medium risk suppliers.

Space and Missile Systems Sector Industrial Base Analysis

Date: March 1996

Originating Agency: Space and Missile Systems Center/SDF
160 Skynet Street, Suite 2315
Los Angeles Air Force Base, CA 90245-4683

Distribution Limitation: For Official Use Only

Abstract:

This Space and Missile Systems Sector Industrial Base Analysis provides an assessment of 248 of 494 key component suppliers which support the Defense Satellite Communication System (DSCS), Defense Meteorological Satellite Program (DMSP), Defense Support Program (DSP), Global Positioning System (GPS), and Titan IV. The ability of these contractors, identified during previous studies, to continue supporting Space and Missile Systems Center (SMC) programs is the focus of the study. This report provides an update of previous evaluations and revisits issues and concerns highlighted in them. The ultimate goal is to provide early risk identification and solicit corrective actions to prevent supplier-centered problems from impacting cost, schedule, performance, quality, or reliability. Suppliers' lead times are increasing and costs are on the rise. Manufacturers responding to this study indicated that pricing fixed cost contracts is virtually impossible because of the instability of raw material prices. Military specification and Environmental Protection Agency requirements continue to be points of contention for suppliers. Respondents stated that they are having difficulty supporting military products which require outdated processes and materials. Profit margins for military products are shrinking and cash flow problems are on the rise. Commercial manufacturers have made or are making the shift to EPA-approved processes and are using less stringent specifications. If given a choice of markets, suppliers favor the less restrictive and environmentally safer commercial market. Eleven companies have moved completely out of government business and eighteen others have closed. If this trend continues as the budget decreases, lead times will undoubtedly increase and the cost of critical components may become prohibitive.

Space Industry Study Report 1996

Date: 1996

Originating Agency: Industrial College of the Armed Forces
National Defense University
Washington, DC

Distribution: <http://www.ndu.edu/ndu/icaf/isspa.html>

Abstract:

This study examines the potential for the United States to privatize and commercialize selected aspects of the space industry to ensure continued U.S. global dominance of space in an increasingly competitive international marketplace. With well-defined and culturally appropriate visions and plans, other nations have successfully leveraged government and industry partnerships to forge world-class firms and satisfy their national interests. The United States should do the same.

The space industry has evolved in interrelated yet distinct interactions among four major sectors--launch vehicles, satellites, satellite operations, and applications--for which sales approach \$70 billion a year. Although initially supported completely by the government, commercial space today is rapidly growing and will soon command a sales majority. Of this growing enterprise, foreign entities have already cornered over 60 percent of the market.

Space applications, whether commercial or military, can be defined as the products and services provided by space assets. While these products and services are either collected (e.g., imagery) or transmitted (e.g., telecommunications) by satellites in orbit, the vast potential commercial opportunities for space applications lie in the exploitation of these data for defense or for the general well-being of the nation.

The space industry plays a strategic role in the nation's future. The application of space technologies in future military operations will facilitate a U.S. global presence, knowledge on demand, space control, and power projection. All of these developments are made possible by designing spacecraft with modern, low-cost techniques, adapting innovative architectures that incorporate distributed satellite systems, developing affordable access to space, and embracing commercial standards in acquisition practices. Although the White House announced a National Space Transportation Policy that attempted to improve the nation's launch situation, no strong national space strategy with a far-reaching vision has emerged. The first and foremost need is to establish a strong national vision and a strategic plan that integrates all activities in space: military, civil, and commercial.

Strategic Systems Industrial Base

Date: May 1997

Originating Agency: U.S. Air Force Air University
Authors: James L Barefield II and Anthony R. Williams

Distribution: Defense Technical Information Center
8725 John J. Kingman Road, Ste 0944
Ft. Belvoir, VA 22060-6218

Abstract:

A significantly reduced defense budget has generated concern on the continuing viability of the defense industrial base. This study focuses on the industrial base's current and future capabilities to design, develop, and produce new bomber, sea launch ballistic missile (SLBM), and intercontinental ballistic missile (ICBM) systems as well as the base's ability to maintain the current inventory of these systems. While identifying existing limitations that may affect the nation's ability to procure and maintain these systems, it also presents some possible solutions to mitigate any erosion identified in the industrial base.

The study is the result of concern on the part of United States Strategic Command (USSTRATCOM) regarding the nation's future ability to produce new strategic systems in addition to maintaining current strategic weapon systems. It examines the core industrial capabilities associated with bomber and SLBM/ICBM systems to determine whether these capabilities are dependent upon continued production; to establish whether industry presently has the ability to restart production; and, assesses industry's ability to maintain current strategic weapons systems. Included are historical trends in research, development and procurement budgets; production histories; new program starts; programmed sustainment profiles; and current industry size, structure, and financial viability.

U.S. R&D Policy for Competitiveness Sector Study: Aircraft

Date: 1996

Originating Agency: National Institute of Standards and Technology (NIST)

Distribution: http://nii.nist.gov/pubs/coc_rd/apdx_air.html
Council on Competitiveness, (202) 682-4292

Abstract:

This report examines the precipitous fall and changing distribution of funding for U.S. industrial R&D in the aerospace industry, because of both reductions in military spending and company cutbacks. Competition from abroad and cuts in the defense budget are forcing U.S. firms to shift focus from high performance to affordability.

Today, the aerospace industry is at a critical juncture. For three straight years sales have fallen, reflecting a sluggish domestic airline industry characterized by cost-cutting, bankruptcies and overcapacity. Meanwhile, U.S. defense cuts have reduced military demand, which had previously helped companies ride out downturns in the commercial sector. Total funding for industrial research and demand (R&D) in the aerospace industry has fallen precipitously since 1988, due primarily to federal reductions in military funding, but also to company cutbacks.

As industry becomes more risk averse, government is under increasing pressure to aid in the development of high-payoff, applied commercial technologies. In fact, recent studies have suggested that two of the biggest roadblocks to improving U.S. competitiveness in the commercial aircraft industry are the lack of government investment in aeronautics materials and manufacturing technologies for subsonic aircraft, and the increasing inability of suppliers to invest in new materials and processes due to defense cuts and their loss of commercial market share. However, government is attempting to increase its own level of collaboration with the aircraft industry and foster greater intra-industry cooperation.

The application of new information technologies will continue to have an enormous impact on both the product and the R&D process in the aircraft industry. Government must strike a better balance between the short-term work industry needs in order to compete effectively in today's marketplace and the longer-term research that will ensure continued technological breakthroughs for future generations.

TECHNOLOGY AND INDUSTRIAL BASE SECTOR STUDIES

Industrial Base Assessment of the Advanced Amphibious Assault Vehicle (AAAV)

Date: April 1995

Originating Agency: U.S. Marine Corps Systems Command
Quantico, VA 22134-5010
Phone: (703) 784-4550

Distribution Limitation: For Official Use Only; Proprietary Information

Abstract:

This analysis examines the capability of the two principal manufacturer's, United Defense Limited Partnership and General Dynamics Land Systems, to produce the US Marine Advanced Amphibious Assault Vehicle. Data on plant personnel, sales, workload backlog, capacity utilization, financial evaluations, facility/product risk, and data automation were collected during on-site interviews with 2 prime contractors and 72 sub-tier vendors. The data were analyzed to rank product and company risk and to determine any new trends in each of these areas. Six companies were considered a medium risk to AAAV production. The majority of the companies visited are capable of Electronic Data Exchange and two thirds have participated in Integrated Product Teams.

The most striking finding in the report is the shortage of capacity to produce Ceramic Armor. Although the technology is mature, the capacity is severely lacking. Regardless of the source selected, up-front funding is required to build a facility and develop efficient production processes to meet the anticipated demand. Raw materials are procured from Japan and the Netherlands. This is not currently an issue, but may become an issue as demand increases. This Industrial Base Assessment recommends that (1) the government perform a horizontal industrial base assessment to determine whether more ceramic armor production capacity is necessary to meet future demand; (2) the program office monitor all medium risk companies for changes in status; and (3) the program office update this report after a prime contractor is selected.

Land Combat Systems Industry Study Report 1996

Date: 1996

Originating Agency:: Industrial College of the Armed Forces
National Defense University
Washington, DC

Distribution: <http://www.ndu.edu/ndu/icafe/isics.html>

Abstract:

This study of the land combat systems (LCS) industry examines the structure, health, and outlook of the tracked and wheeled vehicle industry sectors, encompassing the numerous configurations of combat, combat support, and transportation systems for the two chassis types. Land combat systems (LCS) are at the core of the nation's ability to defend or occupy territory. The U.S. national security strategy is built upon the ability to back up diplomacy with the full spectrum of military action anywhere in the world. Without a viable land combat force, the United States cannot implement that strategy.

Developing the appropriate balance of defensive protection and high-technology offensive capabilities requires a sophisticated government/industry development team. The technologies required are inconsistent with commercial vehicle manufacturing and combat systems require specialized materials produced in low quantities. However, changing world scenarios over the past several years have allowed U.S. leaders to shift budgetary resources away from defense procurement. One result is a significantly smaller LCS industrial base that is looking to a cooperative partnership with the government and a vision crafted by the government for its survival.

The study team concluded that:

- LCS industries are coping with cutbacks in defense spending by downsizing, consolidating, merging, and, to the extent possible, integrating commercial and military production facilities.
- These conditions result in the loss of skilled workers, a higher per-unit cost due to low-rate production, and reductions in the supplier base.
- Upgrade programs and FMS contracts are marginally sustaining tracked-vehicle production.
- Ongoing and upcoming acquisition and rebuilding programs make for a brighter outlook for the wheeled-vehicle industry.
- International markets are open, but competition from foreign industry is tough.

The domestic industry will survive, but the government must cooperate if the U.S. is to preserve an affordable LCS production base. Government-industry partnerships will be an important part of optimizing program efficiencies with limited funds.

Tactical Wheeled Vehicle Industrial Capability Assessment

Date: February 1996

Originating Agency: Defense Contract Management Command
Industrial Analysis Support Office
Philadelphia, PA 19141

Distribution Limitation: For Official Use Only;
Business Sensitive and Proprietary Information

Abstract:

This report was an analysis of the Tactical Wheeled Vehicle (TWV) industry. Four prime contractors manufacture commercial trucks and heavy equipment for commercial and defense consumers. Two of the companies were profitable, one recorded a net loss, and the fourth was not analyzed financially. Workload projections indicate that all prime contractors will remain in the industry to support planned programs. The supplier base is also commercially driven. The primary vehicles in this sector include: High Mobility Multipurpose Wheeled Vehicle; Heavy Expanded Mobility Tactical Truck; Heavy Equipment Transporter System; Family of Medium Tactical Vehicles. The capabilities to design and maintain TWV's are common in the commercial and heavy equipment industry. This report contains figures and tables identifying world market sales, foreign military sales and projected DoD requirements. Major subtier components have dual-use capability and are not endangered. Most subtiers are heavily dependent on commercial orders for viability. There are no significant barriers to military or commercial integration in the TWV sector.

Collaborative Virtual Prototyping Sector Study

Date: May 1996

Originating Agency: The North American Technology and Industrial Base Organization (NATIBO)

Distribution: <http://www.dtic.mil/natibo>

Abstract:

The purpose of this sector study was to assess the maturity, level of use, utility, and viability of Collaborative Virtual Prototyping (CVP), a collection of technologies that enables the establishment of an integrated and simulated acquisition environment. Despite the apparent potential of CVP to support improvements in the weapon system process, numerous questions remain: the existence of technological, cultural, and policy barriers to implementation; the economics of implementing CVP and measurement of the benefits; and acceptance of CVP technologies within the defense development community. The report encompasses the collection and analysis of technical, business, and policy information related to CVP research efforts and industrial capabilities in both the U.S. and Canada, with a particular focus on the challenges faced by small- and medium-sized organizations in applying this emerging technology.

Critical Technology Assessment of the U.S. Semiconductor Materials Industry

Date: April 1997

Originating Agency: U.S. Department of Commerce
Strategic Analysis Division

Distribution: <http://www.bxa.doc.gov/natlsecr/htm#index8>
National Technical Information Service

Abstract:

The first five years of the 1990s were a period of tremendous growth for the semiconductor materials industry. The increase in production of computers swelled the need for semiconductors, as did the significant increase in semiconductor orders from the communications industry, various consumer products manufacturers, and the automotive industry. The U.S. re-emerged over Japan as the largest producer of semiconductors in 1995. As a result, most segments of the U.S. semiconductor materials industry – manufacturing equipment, components and parts, and raw materials – were healthier in 1995 than in 1991.

Global competition has impaired one significant area of the U.S. semiconductor materials industry. Total shipments of domestic packaging materials declined in several important areas between 1991 and 1995. In addition, total research and development in this area fell a dramatic 94 percent during the same time period. The decline in R&D was indicative of the abandoned effort of the two U.S. companies to challenge the foreign domination of the U.S. ceramic materials industry. The episode demonstrates that even in a time of sharply increasing demand for semiconductors, global competition has itself also correspondingly increased.

Electronics Industry Study Report 1996

Date: 1996

Originating Agency: Industrial College of the Armed Forces
National Defense University
Washington, DC

Distribution: <http://www.ndu.edu.ndu/icaf/isele.html>

Abstract

This report presents a strategic perspective of the electronics industry and its role in supporting the materiel requirements of national defense, a comparative analysis of U.S. and foreign electronics companies in both defense and nondefense environments, and specific policy options that would enhance the electronics industry's preparedness.

The state of the U.S. electronics industry in 1996 shows significant optimism in contrast with the 1980s and early 1990s, when concern over the threat of unfair foreign competition alarmed the industry. Computer sales in 1995 were strong compared with 1994. In the semiconductor sector, where competition from Japan was particularly felt, U.S. companies have surged back at the cost of their Japanese and European competition. The consumer electronics sector is showing a very healthy rate of growth. The U.S. continues to dominate the global software industry. The U.S. defense sector is an ever smaller portion of output, with defense electronics sales representing less than 10 percent of the industry's total dollar volume. Consolidation leaves the firms remaining in the defense sector in a strong position, but engenders concerns over the consequences of sole source suppliers and diminishing sources for dated equipment.

Success on the battlefield of the future will depend on the availability of information. Modern warfare's command and control, intelligence, communications, logistics, and weapons systems will rely increasingly on electronics to provide the means to gain an information advantage. Some niche markets will have a relatively constant demand for highly reliable, high-technology military electronics. The challenge for defense planners through the year 2020 is to leverage commercial-sector development for military use.

Information Industry Study Report 1996

Date: 1996

Originating Agency: Industrial College of the Armed Forces
National Defense University
Washington, DC

Distribution: <http://www.ndu.edu/ndu/icaf/isi.html>

Abstract:

This report outlines principles and goals that provide a blueprint for federal government action relative to the information technology industry. The information industry is an essential strategic element of national power. It underlies all other industries and provides the infrastructure that enables their success.

Rarely in history has a single technological development experienced the phenomenal rate of growth that the information technology industry has. Societies around the globe rely increasingly on advanced telecommunications, computer, and other automated information systems in everyday life. Without question, information technology is a force for change—social, political, and economic. Access to information and an understanding of how to use new technologies not only are essential for economic success and national security but are basic abilities people need to function in the evolving global society.

Trends in productivity indicate that the U.S. information industry will continue to be among the fastest-growing sectors of the economy. Through its global operations, the U.S. computer industry already controls more than 75 percent of the world computer market. The government and other industries depend on the industry to develop innovative solutions to problems and to continue to increase productivity, efficiency, competitiveness, and employment in the United States.

In the short and long term, the information industry is postured to respond to the issues and challenges of the 21st century. In fact, technological and legal measures designed to secure data, protect networks, aid law enforcement, and help an industry ready to deal with the competitive and regulatory consequences of all these issues will steadily proliferate. The next step is for the government to define force requirements and capabilities in the arenas of information management and assurance as the basis for developing surge and mobilization policies to support national security resource requirements.

U.S. R&D Policy for Competitiveness Sector Study: Electronics

Date: 1996

Originating Agency: National Institute of Standards and Technology (NIST)

Distribution: http://nii.nist.gov/pubs/coc_rd/apdx_elec.html
Council on Competitiveness, (202) 682-4292

Abstract:

This study focuses primarily on research and development trends in semiconductors, optoelectronics and flat panel displays (FPDs) – three critical building blocks of electronics systems that are expected to drive U.S. competitiveness in electronics markets over the next several decades. National governments have played a pivotal role in the electronics industry worldwide. Government support will remain vital to many nations' and companies' research and development efforts.

Traditionally, the Department of Defense has been the largest federal contributor to R&D in this sector. Justifying its support under the rubric of dual-use technology development, the DOD accounts for 88% of federal funding for FPD technology. Approximately \$645.7 million has been spent on FPD research over the past five years, although funding has dropped almost 39% from its 1994 peak of \$185.9 million. Government R&D funding influences optoelectronics to varied degrees. The U.S. government has substantial influence on the development of niche products through support for defense-relevant technologies and applications; and the development of small businesses.

Looking ahead, the fusion of electronics technologies has the potential to radically change the electronics industry. With the integration of the chip and the FPD, firms producing both will have a competitive advantage. Industry analysts believe FPDs will one day be as economically important as semiconductors are today. If this is so, the American electronics industry could be in danger. U.S. initiatives to enter this market seem futile given that Japanese firms now dominate the FPD market in display supplies, manufacturing equipment and know-how. In the meantime, teaming across the electronics industry will continue to be a primary contributor to economic competitiveness.

Effect of Imports of Crude Oil and Petroleum on the National Security

Date: 1996-97 edition

Originating Agency: U.S. Department of Commerce
Bureau of Export Administration

Distribution: The Association for Manufacturing Technology,
(703)827-1204

Abstract:

At the request of the Independent Petroleum Association of America and several other industry associations, the Department of Commerce/Bureau of Export Administration (BXA) conducted an investigation under Section 232 of the Trade Expansion Act of 1962, as amended, to determine the effect of imports of crude oil and refined petroleum products on U.S. national security. The report found that since the previous Section 232 Petroleum finding in 1988, there had been some improvement in U.S. energy security. The breakup of the Soviet Union and the apparent disarray within OPEC have enhanced U.S. energy security. Lower oil prices on balance have benefited the U.S. economy. However, factors leading toward a contraction of the U.S. petroleum industry and, as a result, a growing import dependence, led BXA to find that petroleum imports threaten to impair the national security.

**Survey of the Use and Control of Hazardous Materials
in the SMC Industrial Base**

Date: August 1995

Originating Agency: Space and Missile Systems Center/SDF
160 Skynet Street, Suite 2315
Los Angeles Air Force Base, CA 90245-4683

Distribution Limitation: For Official Use Only / Proprietary Data

Abstract:

This survey of the Space and Missile Systems Center (SMC) industrial base was conducted to determine the impact of the reduction or elimination of ozone depleting substances (ODS) and Environmental Protection Agency Priority Pollutant (EPA-17) chemicals on suppliers' ability to continue supporting production of space and missile programs. Approximately 400 suppliers included in the Space and Missile Industrial Information System (SAMIIS) were polled. The most significant finding was the number of contractors that will be unable to support SMC programs when ODS and EPA-17 restrictions are fully imposed. The survey found that the reduction of negative environmental effects requires substitution for currently used hazardous materials and/or modification of standard processes. An alternative is to perform the hazardous process in a closed-loop, recirculating envelope that captures, scrubs, and collects by-products. There were no reports of resolving a problem by simply replacing a hazardous material with a nonhazardous material. The study concluded that it is imperative that the SMC program offices work closely with contractors before ODS is eliminated to implement alternative materials and processes so that component availability is not impeded. However, process improvement by a contractor at his own expense is proprietary and the results cannot be treated as a universal solution. The report recommended that the program offices assist all respondents requesting more information and the expansion of the scope of this survey to include all remaining SMC suppliers to ascertain what percentage of the SMC industrial base is currently using Class I and Class II ODSs, and EPA-17 Hazardous Materials in their manufacturing processes and to locate SMC suppliers that must delay or halt production to meet ODS and EPA-17 material elimination or reduction goals.

Advanced Materials Industry Study Report 1996

Date: 1996

Originating Agency: Industrial College of the Armed Forces
National Defense University
Washington, DC

Distribution: <http://www.ndu.edu/ndu/icaf/isadt.html>

Abstract:

This report describes the advanced materials (AMATs) industry and market, current conditions and trends, and the ability of the industry to meet national security needs and to contribute to the economic well-being of the country.

The advanced materials industry produces materials with superior performance characteristics that enable end products to be better than those made from conventional materials; it does not produce the end products. Although the federal government, especially the Department of Defense, sponsored much of the original research and development of advanced materials, that funding has recently been reduced significantly. The report's findings include:

- Market forces will continue to drive the AMATs industry toward more commercially oriented R&D and products. Although the defense drawdown reduced the use of advanced composites and specialty metals overall, growth in the civilian use of AMATs has sustained some segments of the industry. Sporting goods and commercial space applications now dominate the market. Consequently, a few producers dominate segments of the industry.
- Although most AMATs producers have downsized and consolidated their businesses, and many have moved offshore, the U.S. AMATs industry still has the technological know-how, capital facilities, and experience to continue to be a global leader. However, the U.S. may have to deal with future dependency on transnational corporations or foreign sources.
- Large segments of the AMATs industry are not profitable. Significant overcapacity and idle high-value machinery are common, particularly in the titanium industry, where the titanium production of the former Soviet Union has garnered market share concurrently with U.S. defense procurement reductions.

Despite these trends, access by U.S. manufacturers to AMATs both for economic growth and to meet national security needs is not threatened. However, this strategic arena needs to be closely monitored from a national security perspective.

TECHNOLOGY AND INDUSTRIAL BASE SECTOR STUDIES

Advanced Materials Technology Industrial Base: An Analysis and Assessment of Specialty Metals and Advanced Composites

Date: January 1996

Originating Agency: Office of the Under Secretary of Defense (Acquisition and Technology)

Distribution: Defense Technical Information Center
8725 John J. Kingman Road, Ste 0944
Ft. Belvoir, VA 22060-6218

Abstract:

This study assessed the extent to which the commercial capabilities of the technology and industrial base for advanced materials can provide access to the leading edge technology products necessary to meet military requirements. The focus was on load carrying metal and composite structural materials that provide current or future advantages in military applications. The study, which was conducted within the context of the Defense Department's Dual Use Technology Strategy, examines whether commercial capabilities will be sufficient by themselves or whether their use is impeded by issues of affordability or availability of high-end technology.

TECHNOLOGY AND INDUSTRIAL BASE SECTOR STUDIES

Ceramic Armor Sector Study

Date: May 1996

Originating Agency: U.S. Marine Corps Systems Command
Quantico, VA 22134-5010
Phone: (703) 784-4550

Distribution Limitation: For Official Use Only;
Business Sensitive and Proprietary Information

Abstract:

This study examined the supplier base for ceramic armor for possible use on the Advanced Amphibious Assault Vehicle (AAAV). The Army Research Laboratory, Alfred University, and ten subtier vendors were visited. The data was collected to assess the health of the industry. This effort is a follow-on to the AAAV study completed in June 1991. The conclusions of the study were that the ceramic armor industrial base is healthy and no government intervention is warranted at this time. Four suppliers were considered as likely candidates to produce the armor when required. Facility and capital equipment funding may be required in the future depending on which armor is selected. An update to this report is recommended after the prime and subtier vendors are identified.

TECHNOLOGY AND INDUSTRIAL BASE SECTOR STUDIES

Integrated Capability Assessment of the U. S. Composites Corporation

Date: April 1996

Originating Agency: Defense Contract Management Command
Industrial Analysis Support Office
Philadelphia, PA 19141

Distribution Limitation: For Official Use Only;
Business Sensitive and Proprietary Information

Abstract:

This report identified three suppliers capable of producing the encasements for the Shoulder Launched Multipurpose Assault Weapon (SMAW). One of the companies was considered a high financial risk. The manufacturing technologies were determined to be *not unique* to any one supplier. There was a determination that there was no risk associated with the technologies. Recommendations were made that the supplier data be maintained in the USMC weapon system and program information systems and that it may be in the best interests of the Government to purchase the proprietary process from one of the suppliers and protect the equipment for future acquisition. The report was utilized by the SMAW-CP Source Selection Team in the award of a contract in September, 1996.

Ion Beam Processing (IBP) Technologies Sector Study

Date: June 1996

Originating Agency: The North American Technology and Industrial Base Organization (NATIBO)

Distribution: <http://www.dtic.mil/natibo>

Abstract:

This study identifies and assesses the maturity and applicability of ion beam processing (IBP) technologies to solve many metal surface finishing problems found in the industrial base. Despite the fact that ion implantation has found a commercial niche improving the wear properties of medical devices such as titanium hip and knee joints, and has been widely used for over 30 years in the semiconductor industry to provide precise control of semiconductor wafer manufacturing, IBP technologies have not been successful in penetrating other North American markets.

This study investigated mass analyzed ion implantation, the technique used in semiconductor manufacturing; direct nitrogen ion implantation; direct metal ion implantation; plasma source ion implantation; and ion beam assisted deposition. The report highlights the benefits of IBP, addresses the technological and socio-economic barriers preventing the adoption of IBP technologies, and provides recommendations for government and industry to more fully capitalize on the potential of IBP in the metal surface finishing industry sector.

**Ammunition Industrial Base: Information on DOD's
Assessment of Requirements**

Date: May 1996

Originating Agency: General Accounting Office
Report to Congress, No. NSIAD-96-133

Distribution: <http://www.gao.gov/aIndexFY96/subject/Ammuni.htm>

Abstract:

Pursuant to a congressional request, GAO reviewed the Department of Defense's (DOD) ability to meet peacetime ammunition requirements, and to replenish the ammunition stockpile following two major regional conflicts.

GAO found that: (1) since 1978, the production capacity of the ammunition industrial base has dramatically decreased; (2) while indirect fire munitions constitute the largest part of the war reserve inventory, the decrease in war reserve requirements since the end of the Persian Gulf War has caused the percentage of direct fire munitions to increase; (3) the distribution of funding between government-owned and contractor-owned facilities has remained steady since 1987; (4) the decline of ammunition funding has not caused any significant peacetime shortages; (5) substitute munitions or increased production rates can compensate for any understocked items; (6) no industrial base problems exist that would prevent replenishing the stockpile after the completion of those two regional conflicts; (7) if the response period is shortened or if the required replenishment level is raised, the industrial base may not be able to simultaneously meet peacetime ammunition needs and replenish the ammunition stockpile following the regional conflicts; and (8) private studies of the industrial base conclude that the industrial base is inadequate to meet munitions requirements after two major regional conflicts.

**Defense Ammunition: Significant Problems Left Unattended
Will Get Worse**

Date: June 1996

Originating Agency: General Accounting Office
Report No. NSIAD-96-129

Distribution: <http://www.gao.gov/AIndexFY96/subject/Ammuni.htm>

Abstract:

According to DOD, the ammunition stockpile, which is to meet peacetime needs and support two major regional conflicts, has no major shortages. However, there is no longer a requirement to surge the industrial base during conflicts. In addition, the most lethal, up-to-date, "preferred" munitions will be at a premium; some requisitions will be filled with older "substitute" ammunition items, but these items are considered adequate by DOD to defeat the threat that U.S. forces are expected to encounter.

DOD's position is based on a number of studies, including its 1994 and 1995 financial viability studies of the firms comprising the ammunition industrial base, which concluded that the base is adequate to meet DOD's continued production and replenishment requirements. DOD is confident in this position, even though it did not receive sufficient data to evaluate the financial condition of all the firms in the industrial base. Although the firms were not obligated to respond, the 57 firms that responded, and which were fully evaluated in the 1994 study, held about 75 percent of the production capacity in the industrial base. DOD assumed that the remaining 45 firms that did not respond were financially viable. DOD officials stated that if the firms were having financial difficulties, they would be motivated to respond. In their opinion, it would be in a firm's best interests to respond if it was having financial difficulties because that response would, in effect, be a request for DOD to help the firm remain viable.

An assessment of whether the ammunition industrial base is adequate for replenishment depends on the assumptions used. Because the underlying assumptions concerning replenishment levels and time frames form the basis of the services' ammunition requirements, changes to the Defense Planning Guidance could cause DOD's industrial base assessment to change even if production capacity within the industrial base remains stable. The sensitivity of the assessment to changes in assumptions is illustrated by other private studies that have concluded that the industrial base is inadequate to meet replenishment requirements during and following a national emergency. Those studies are based on underlying assumptions that differ considerably from the assumptions in the current Defense Planning Guidance.

JDAM Industrial Capability Analysis

Date: January 1995

Originating Agency: USAF Aeronautical Systems Center
ASC/VXYP
Eglin AFB, FL 32542-6807

Distribution Limitation: For Official Use Only; Proprietary Information

Abstract:

This report analyzed twenty-four contractors and subcontractors, nine first tier and fifteen second tier. Their products represented specialized materials, electronics, electrical, cast and machined parts, and services. Most, although not all, of the Martin Marietta subcontractors were aware that Joint Direct Attack Munition (JDAM) is a special-case procurement in that the application of military specifications and standards can be waived when other design solutions result in improved affordability without compromising system performance. In several cases, relief was granted and cost savings realized. In other cases, however, proposals to substitute successful commercial materials were not accepted and an explanation of why the proposal was not approved was provided. Furthermore, several contractors expressed reluctance to propose changes because of their belief that the approval process is too slow to make it worthwhile. Since several requests were granted prompt approval, contractors may be unaware of the efforts being made to increase request approval.

Program offices are the direct customer for the production of munitions and are directly impacted by problems in the industrial base. Better tools for monitoring the entire production base for a system are needed. In the age of easily available, high-performance, and low-cost computer systems, a production base monitoring software application package needs to be developed. Maintaining an up-to-date "map" of the key suppliers and relationships for systems will allow immediate, real-time assessment of the impact of abrupt changes on the program. Being able to immediately estimate the impact of late breaking news will, for the first time, enable a timely response, whether this response is to immediately contact alternative suppliers or to flag that company's part of the production chain for close monitoring. Once the initial structure has been established, maintaining it becomes relatively easy and inexpensive. This initial structure for JDAM could be provided on disk as part of any additional industrial base assessment. Ongoing contact with all levels of the production base provides up-to-date information, while the lower level contractors benefit from being involved as team members rather than as anonymous and disposable units, again encouraging the lean manufacturing concept. With improved team relationships, the probability is high that the lower tiers will surface ideas that could result in cost savings.

Munitions Industry Study Report 1996

Date: 1996

Originating Agency: Industrial College of the Armed Forces
National Defense University
Washington, DC

Distribution: <http://www.ndu.edu/ndu/icaf/ismun.html>

Abstract:

This report assesses the current state of the U.S. munitions industry, the challenges it faces, and its outlook. Data were gathered on most facets of the industry, from the extremely high-technology area of precision-guided missiles (PGM) to the lower technology production of bombs, explosives, and propellants.

Although the United States remains the world leader in munitions technology, the nation's ability to rapidly produce high-technology weapons on a large scale has diminished because of downsized military procurements and increased foreign competition. The report's findings include:

- The munitions industrial base continues to shrink as production requirements are reduced. Munitions producers will continue to use consolidation, cooperative arrangements, and global partnerships as an industrial survival strategy.
- Although the U.S. PGM stockpile is impressive, it does not include the sheer number of "preferred" weapons required to conduct two major regional contingencies (MRC). The addition of the global positioning system (GPS) family of guided munitions will improve this shortfall, but not before 2000.
- Although the success of U.S. weapons in the Gulf War made the U.S. the world's leading supplier of high-technology munitions, global competition has intensified to the point where the U.S. competitive advantage is eroding.
- New government-industry relationships are emerging because of the need for cooperation and partnerships. Industry cannot establish global partnerships unless the government removes impediments.
- The continuing shrinkage of the U.S. production base may eventually decrease the U.S. capability to replenish stocks and could result in dependency on foreign producers for replenishment.

The study group recommends the following:

- Authorize multiyear funding for munitions programs to provide needed stability.
- Fund service PGM requirements fully to support tomorrow's force structure.
- Stimulate munitions R&D efforts by removing obstacles and providing incentives.
- Continue collaborative partnerships with industry and move toward the privatization of the national laboratories.

In the final analysis, the munitions industry is troubled but not desperate. There is reason for concern, but no major government intervention is currently required.

National Security Assessment of the Cartridge and Propellant Actuated Device Industry

Date: 1996-97 edition

Originating Agency: Naval Surface Warfare Center,
Indian Head, Maryland

Distribution: The Association for Manufacturing Technology,
(703) 827-1204

Abstract:

This assessment addresses the health and competitiveness of the cartridge and propellant actuated device (CAD/PAD) industry. CAD/PADs are explosive devices used predominantly in weapon systems, performing such functions as aircrew ejection in emergencies, flare ejection, and bomb and missile releases, but also have a growing use in commercial applications, such as automobile airbags, emergency cutting tools, and fire extinguisher actuators. This assessment was undertaken at the request of the U.S. Navy's Naval Surface Warfare Center in Indian Head, Maryland. The Navy initiated the study out of concern for the long-term survival of the firms that supply these products.

The assessment found a one-third drop in the number of suppliers, a shrinking defense sector and a growing commercial sector, and that the small suppliers, who were most likely to rely on defense endmarkets, were in the worst financial condition. The study recommended that the Navy initiate bi-annual meetings with industry to build a closer working relationship with the remaining firms, to give information about the potential future demand, and to better understand the problems of industry. It was also suggested that the facility in Indian Head, MD, be used as a pre-shipping test facility, to help alleviate the delays that were uncovered in the study. Finally, the Commerce Department also introduced the remaining CAD/PAD firms to a potential new market, Department of Justice law enforcement programs, which will allow these firms to maintain defense capabilities while exploring other markets.

Biotechnology Industry Study Report 1996

Date: 1996

Originating Agency: Industrial College of the Armed Forces
National Defense University
Washington, DC

Distribution: <http://www.ndu.edu/ndu/ica/isbio.html>

Abstract

The purpose of this report is to describe the applications, condition, and trends of the biotechnology industry against the background of national security requirements and military surge and mobilization needs.

Biotechnology products and processes are revolutionizing the health care, agricultural, industrial chemical, and environmental fields. This young, risky, industry holds endless promise for spin-off products, manufacturing processes in other industries, and sustainability for the future. Biotechnology is niche oriented, geared toward developing high-technology, high-quality, and less expensive products for mankind. The United States leads the world in biotechnology, but the industry is at a critical point in its development cycle and needs continued support for basic research. Just one new discovery can completely change the structure of the industry.

The industry's potential military applications range from biological defenses to new protective materials. At the more detailed level of military mobilization and surge, biotechnology does not correct all the problems in the industrial segments it affects, and it may raise new risks in some instances. As a new industry, biotechnology will apply new business management practices that closely size plant capacity, staffing, and inventories to market requirements. As such, the industry is not generally amenable to achieving economies of scale through high-quantity production. Additionally, the FDA approves products to be manufactured only at a certain production rate. Any change requires recertification, which is a lengthy process. As a result, the military cannot expect the industry to carry much excess capacity that could later be filled with mobilization orders. Current technology does not allow for easy switching of products within plants; normally, plants are dedicated to a single product. Over time, greater flexibility is expected, but the current situation limits the ability to surge production when mobilization requires. The industry provides high-quality, high-technology products but does not have the dexterity to expand quickly. A mobilization deficiency will exist unless the military takes measures to offset purely civilian market factors.

TECHNOLOGY AND INDUSTRIAL BASE SECTOR STUDIES

Department of Defense Nuclear/Biological/Chemical (NBC) Warfare Defense

Date: April 1996

Originating Agency: Department Of Defense, Washington, DC

Distribution: Defense Technical Information Center
Ft. Belvoir, VA 22060-6218
Document No. ADA322938

Abstract:

The National Defense Authorization Act for Fiscal Year 1994, Public Law No. 103-160, Section 1703, mandates the consolidation of all Department of Defense chemical and biological defense programs. As part of this consolidation, the Secretary of Defense is directed to submit an assessment and a description of plans to improve readiness to survive, fight and win in a chemically or biologically contaminated environment. This report contains modernization plan summaries which highlight the Department's approach to improve current NBC defense equipment and resolve current shortcomings in the program.

Dual-Use Technology and Sustainment of the Chemical Industrial Base

Date: June 1995

Originating Agency: Naval Postgraduate School, Monterey, CA

Distribution: Defense Technical Information Center
8725 John J. Kingman Road, Ste 0944
Ft Belvoir, VA 22060-6218

Abstract:

The changing defense acquisition process and the declining defense budget require alternative methods for sustaining unique sectors of the defense technology industrial base, such as the chemical sector. One method is the dual-use of the technology by the producers within the base to manufacture the products required to provide Nuclear, Biological and Chemical (NBC) defensive support for the nation. As the size of the defense budget and force structure shrinks, so will the number of producers within the chemical industrial base (CIB), but the need for alternative sustainment methods will increase. The purpose of this report is to analyze and determine whether dual-use can be applied and what benefits it offers the CIB. Successful applications of the dual-use of technology in other sectors are analyzed. Research determined that dual-use can be applied to the CIB in the areas of detection, individual protection, collective protective filtration, and biological defense. Additionally, the research revealed that the dual-production (i.e., reuse or joint use) of the production facilities is as important as the dual-use of the technology. This report concludes that DoD should further promote dual-use as a means of sustaining and retaining producers in the CIB.

**Joint Service Industrial Assessment for the Nuclear,
Biological and Chemical (NBC) Defense Sector**

Date: August 1996

Originating Agency: Joint Service Material Group, Aberdeen Proving Ground, MD

Distribution: Defense Technical Information Center
Ft. Belvoir, VA 22060-6218
Document No. ADA324649

Abstract

This report attempts to capture a “snapshot” of the industrial health of the current and future Nuclear, Biological and Chemical (NBC) Defense Sector. The study is based on the requirement for the U.S. forces to fight two nearly simultaneous major regional conflicts. The purpose is to provide the Joint NBC Defense Board with a screening tool that identifies critical areas within the NBC defense sector of the DoD industrial base. This was accomplished by assessing the current and projected status of the four Services’ NBC defense materiel stockage (fielded items); research, development and acquisition (RDA) programs; and related critical technologies. Results of the study indicated that a significant portion of all items assessed fell in the moderate risk (adequate capabilities *may* exist) category. However, critical shortages in protective clothing, filters, medical supplies, and batteries for chemical defense equipment were identified. Furthermore, there are shortfalls in the inventory of nonmedical chemical defense equipment because of insufficient resourcing. The report concluded that the sector consists mainly of small businesses that do not sell to the commercial sector and further reductions in DoD spending will cause some of these businesses to close.

Meeting the Challenge - U.S. Industry Faces the 21st Century - The Chemical Industry

Date: January 1996

Originating Agency: Department of Commerce
Office of Technology Policy
Washington, D.C.

Distribution: National Technical Information Service
Order number PB96-138094CFK

Abstract:

This report identifies the most important of the many interacting factors that will determine the future competitiveness of U.S. based chemicals R&D and production. It describes the contributions of the U.S. chemical industry to the U.S. economy, the structure and competitiveness of the industry, the key determinants of its current strength, and the factors most likely to determine its future performance.

Critical to the future competitiveness of the U.S. chemical industry will be its ability to maintain its technological edge. To do so it must continue and increase already high levels of investment in R&D and new plants and equipment (P&E). Maintaining the competitiveness of U.S. based R&D and production will require that rising amounts – and rising portions – of U.S. chemical industry P&E investment go to foreign countries.

Meeting the rising R&D and P&E investment needs of the future will require a chemical industry that is profitable and attractive to investors. While the industry's profitability will be determined primarily by individual company decisions, government decisions that influence the environment in which U.S. producers compete will also be increasingly critical to the industry's continued growth and competitiveness. In order to survive and grow, major U.S. and foreign chemical companies will have to compete globally, selling - and often investing and producing - in markets around the world. Increasingly, the United States will be competing with other countries to host chemical R&D and production. The benefits of an internationally competitive U.S. chemical industry to the U.S. economy make it critical to keep the industry strong. In an era of tightening competition, the margin for error in both company decisions and government policies will be narrower than ever before.

U.S. R&D Policy for Competitiveness Sector Study: Chemical

Date: 1996

Originating Agency: National Institute of Standards and Technology (NIST)

Distribution: http://nii.nist.gov/pubs/coc_rd/apdx_chem.html
Council on Competitiveness, (202) 682-4292

Abstract:

Since the 1980s, the chemical industry has seen significant restructuring and downsizing. One of the most important effects has been a general reduction in internal research and development (R&D) spending – some companies have even eliminated research laboratories. The industry has enjoyed solid growth in demand and recorded its best profit increases since the late 1980s. Production of most types of basic chemicals is high. Productivity is increasing after several years of industry downsizing, and prices are recovering from the lows of the past several years. After little or no growth during the 1990s, U.S. exports of chemical products increased by 10 percent in 1994, with all sectors of the industry posting substantial growth.

In the past, government laboratories' R&D agendas were shaped by the Cold War and often did not coincide with industry's needs. In spite of this, the chemical sector has always relied upon the government to help sponsor its R&D needs. Federal spending on chemical research, which has been growing 6 percent annually since 1987, rose an estimated 3 percent in 1994 to \$1.05 billion. The Department of Energy (DOE) is the largest government R&D contributor to the chemical industry, providing 20 percent of the government's total chemistry-related R&D outlay. Through Cooperative Research and Development Agreements, DOE labs transfer their spin-off technologies to industry, work with industry to develop specific product and process technologies that answer both government and commercial needs, and work with industry to develop breakthrough technologies in existing markets.

The chemical industry's long-term viability is dependent upon its capacity to continue making breakthrough discoveries – not just product upgrades and technical modifications. The way in which chemical companies have begun to ensure this capacity is to engage in leveraged partnerships with government, academia and other companies. Nonetheless, in an uncertain federal budgetary climate, companies must remember that ultimately, their R&D goals will have to be met by themselves.

A Comparative Financial Analysis of the U.S. Defense Industry During the Post Cold War Defense Drawdown

Date: December 1995

Originating Agency: Naval Postgraduate School, Monterey, CA
Author: William T. Chatman

Distribution: Defense Technical Information Service
Ft. Belvoir, VA 22060-6218
Document No. ADA305648

Abstract:

The on-going defense drawdown has left leaders in both Government and industry concerned over the survival of the U.S. defense industrial base. The purpose of this thesis is to explore whether or not such concern is warranted given the various strategic efforts undertaken by the management of U.S. defense firms to ensure that their companies remain competitive, profitable, and financially viable despite shrinking defense budgets. Using eight different financial ratios as performance measures of solvency, efficiency, and profitability, this paper examines the financial viability of 28 defense contractors from 1986 through 1994. Graphical and statistical analysis techniques are used to identify ratio trends; measure defense industry performance compared to U.S. manufacturing industry averages; and identify the relationship between defense firms' strategic commitment to/dependence on defense business and their financial viability over the period of the defense drawdown. The thesis concludes that the solvency ratio trends show steadily to improving conditions, while the trends for efficiency and profitability ratios are somewhat mixed. Analysis also shows that, compared to the U.S. manufacturing industry at large, the defense industry was less solvent, less efficient, and more profitable over the period of the drawdown. However, the more defense-dependent firms were generally more solvent, more efficient, and less profitable than defense firms whose strategies indicated less dependence on defense business.

The Diffusion of Military Technologies to Foreign Nations: Arms Transfer Can Preserve the Defense Technological and Industrial Base

Date: 1995

Originating Agency: U.S. Air Force Air University
Authors: William J. DelGrego and Maris J. McCrabb

Distribution: Defense Technical Information Center
8725 John J. Kingman Road, Ste 0944
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Abstract:

The purpose of this work is to recommend that the U.S. government maintain the defense technological and industrial base (DTIB) by aggressively supporting the U.S. defense industry in the arms transfer process. Ironically, this recommendation is contrary to the position held at the onset of this research and analysis effort. The report is written to inform and enhance the understanding of a wide spectrum of readers, from aircraft and vehicle operators to senior government officials, concerning the DTIB and how arms transfers can help in its preservation. Based on the premise that the DTIB requires preservation because the continuing drawdown of U.S. military forces and equipment has caused its deterioration, this report asserts that this decline can only be arrested with the help of the U.S. government.

The history of arms transfers is used to demonstrate this assertion. The report describes arms transfers as an instrument of foreign policy based on U.S. national security interests and the foreign policy challenges of the day. It predicts arms transfers will continue to be an instrument of foreign policy and can be used to enhance the DTIB. Finally, it focuses on the current arms transfer decisionmaking process and represents it as a "Labyrinth of Control." This section of the paper demonstrates the maze of controls used to adequately ensure that U.S. military technologies are not diffused to foreign nations. A common, but misguided, view is that the U.S. is selling its technological superiority through arms sales. In reality, the U.S. can sell a technological product while maintaining control of related technological processes. Arms transfers can enhance supporting technologies by preserving the DTIB through ongoing and continuous production.

In conclusion, this paper recommends the U.S. government support industry by becoming actively involved in the arms transfer process. By allowing the transfer of U.S. military weapon systems in their export version, the DTIB can be maintained without any loss in technological superiority. This study shows the U.S. government can maintain the DTIB by actively and aggressively supporting industry in the arms transfer process.

**Estimates of Emergency Operating Capacity in U.S.
Manufacturing Industries: 1994-2005**

Date: February 1997

Originating Agency: U.S. Department of Energy
Contract DE-AC06-76RLO 1830

Distribution: National Technical Information Service
5285 Port Royal Road
Springfield, VA

Abstract:

To develop integrated policies for mobilization preparedness, planners require estimates and projections of available productive capacity during national emergency conditions. This report is part of an ongoing study that supports the Federal Emergency Planning Agency (FEMA) and DoD mobilization planning studies. These findings are intended for use in planning models that are designed to predict the demands for industry sectors that would occur under conditions such as a military mobilization or a major national disaster. In forecasting emergency operating capacity for each of 458 industries, this report provides industry capacity projections that reflect continued downsizing of the defense establishment but modest growth in the remainder of the economy.

The report methodology used time series regression models based on industry data to obtain a response function of industry capital stock to levels of industrial output. The information in this report relies on the Census Bureau's recurring Survey of Plant Capacity. The unweighted average growth rate of capacity for all 458 industries from 1995 to 2005 is 2.3 percent per year. However, there is considerable dispersion in the growth rates across industries. Capacity in ten percent of the industries is projected to decline over the next decade, while in 65 industries, capacity is expected to grow by more than 5 percent per year.

Report on the Effects of Mergers in the Defense Industry

Date: March 1997

Originating Agency: Office of the Secretary of Defense, Washington, DC

Distribution: National Technical Information Center
Ft. Belvoir, VA 22060-6218
Document No.: ADA323934

Abstract:

Defense procurement outlays in constant dollars, i.e., adjusted for inflation, have declined 61 percent from 1987 to 1998. This decline has lowered contractor revenues and increased their excess capacity. Companies have responded to these developments in predictable ways -- reducing employment, closing facilities, reengineering processes to become more efficient, developing closer relations with their suppliers, and pursuing merger and acquisition opportunities. Section 826 of the National Defense Authorization Act for Fiscal Year 1997 requires the Secretary of Defense to conduct a study on mergers and acquisitions in the defense sector. It specifies that the study shall address: the effectiveness of defense mergers and acquisitions in eliminating excess capacity within the defense industry; the degree of change in the dependence by defense contractors on defense-related Federal contracts within their overall business after mergers; the effect on defense industry employment resulting from defense mergers and acquisitions occurring during the three years preceding the date of the enactment of this Act; and the effect on competition for defense contracts. This is the report to Congress on that study effort.

Shipbuilding Industry Study Report 1996

Date: 1996

Originating Agency: Industrial College of the Armed Forces
National Defense University
Washington, DC

Distribution: <http://www.ndu.edu/ndu/icaf/issbp.html>

Abstract:

The purpose of this study of the shipbuilding industry was to answer two questions: Are the capacity and viability of the U.S.'s seven remaining shipyards sufficient to meet national security needs for both sealift assets and combatant vessels? Is it feasible for U.S. shipyards to compete in an international commercial market for oceangoing vessels as a means of preserving U.S. shipyard capacity, capability, and viability? To answer these questions the study team visited both U.S. and foreign shipyards; consulted personnel from the U.S. Navy, the primary customer of large U.S. shipyards; met with buyers of commercial ships; and examined the role of governments in the shipbuilding industry.

The capability and capacity to build large oceangoing vessels to respond to global threats, project U.S. power, and provide sealift is important to the objectives of the U.S. national security strategy. However, since the end of the Cold War, Navy downsizing, abandonment of the goal of a 600-ship Navy, and termination of orders for new ships has caused many U.S. shipyards to close their doors or to focus solely on ship repair. If even a few U.S. shipyards are to remain in business, they must begin to compete in the commercial shipbuilding market by streamlining their management structures, embracing the technological advances enjoyed by foreign shipbuilding firms, employing new manufacturing processes, and revitalizing the productivity of the labor force. The failure of the U.S. industry to achieve market share in commercial ship construction is largely attributable to a conscious decision by the shipyards to dedicate their resources to the significantly more lucrative market of U.S. Navy work over the last two decades.

Nevertheless, this study concludes that the current U.S. capacity to build and repair ships can support short term (1-5 years) national security resource requirements under the scenario that assumes two major regional conflicts. This capacity includes support for the construction of orders and projected orders for Navy combatants, auxiliaries, and strategic sealift vessels, both new construction, and commercial ship conversion--a more cost-effective alternative. Current capacity can support full surge and sustainment as delineated in the latest Mobility Requirements Study Bottom-Up Review Update. In the long term (1-21 years), the projections indicate that even if the shipbuilding capacity further shrinks to only five major building yards, capacity will still

TECHNOLOGY AND INDUSTRIAL BASE SECTOR STUDIES

be sufficient to produce the number of new platforms necessary to replace the existing 300-ship Navy fleet.

Transportation Industry Study Report 1996

Date: 1996

Originating Agency: Industrial College of the Armed Forces
National Defense University
Washington, DC

Distribution: <http://www.ndu.edu/ndu/icaf/istra.html>

Abstract:

Today's transportation industry is well positioned for global expansion and competition. All segments of the industry are currently profitable and are actively seeking faster, better, and more efficient ways to do business, including more ways to make multimodalism into true intermodalism. However, some near-term capacity shortfalls and mobilization issues must be resolved to ensure that the industry can continue to fulfill national security requirements for transportation into the next century.

Manufacturers, movers of raw materials and finished goods throughout the global marketplace, and the armed forces providing manpower, equipment, supplies, and support to humanitarian efforts or hostilities around the globe all need safe, reliable transportation. This study reviewed the four major modes of transportation -air, sea, rail, and truck - each of which has its own industry structure, assets, and capabilities. It then examined how well the modes work together to provide seamless transportation for both commercial and military movements. Finally, current and potential industry capacity were compared with the national security transportation requirements validated in the 1995 Mobility Requirements Study Bottom-Up Review Update.

The U.S. transportation industry is healthy and growing stronger. As intermodalism becomes inculcated into business practices, all segments of the industry will synergistically interact to provide seamless service at an efficient and cost-effective rate. Working together, the country's organic military and commercial transportation assets provide most of the lift required to support the two major regional conflicts (MRCs) scenario. The shortfalls that do exist have been specifically addressed by the current administration and will, for the most part, be rectified by acquisition of the C-17 aircraft and additional large, medium-speed roll-on/roll-off vessels. Finally, the government has a definite role to play in repairing or replacing the nation's aging transportation infrastructure. While there is some room for improvement, our study concluded that the United States is the world leader in transportation and will remain so as the nation moves into the next century.

U.S. R&D Policy for Competitiveness Sector Study: Automotive

Date: 1996

Originating Agency: National Institute of Standards and Technology (NIST)

Distribution: http://nii.nist.gov/pubs/coc_rd/apdx_auto.html
Council on Competitiveness, (202) 682-4292

Abstract:

The automotive industry is a crucial part of the American economy. The largest manufacturing industry in North America, it accounts for 4 percent to 5 percent of the U.S. Gross Domestic Product (GDP). Aggregate research and development (R&D) spending by the Big Three (Chrysler, Ford, and General Motors) has grown steadily over the past decade, driven by rising development costs. Most R&D spending is tied to the development of products, but the share devoted to improving the manufacturing process has increased over the past five years and is expected to continue to grow as companies recognize the need both to break down barriers between research, design and manufacturing, and to speed products to market.

Partnership for a New Generation of Vehicles (PNGV), perhaps the most ambitious of United States Council for Automotive Research's (U.S.CAR) projects, is designed to bring both corporate and government researchers together. The government did not commit any new funds to PNGV initially, but instead redistributed several million dollars spent on R&D relevant to the auto industry across several government agencies. The Department of Energy's (DOE) national laboratories have been the most active government participants in PNGV, establishing a Clean Car Coordinating Committee to manage their involvement. Industry and government researchers are spending more time in each other's facilities, and the companies have discovered use in the labs' valuable instrumentation, test equipment and expertise.

Partnerships are likely to become even more important in the coming years. Suppliers are developing the underlying technologies for an Intelligent Vehicle Highway System (IVHS), which has the potential to vastly improve traffic flow. IVHS would also require a large government investment in both research and infrastructure improvements, but the federal funding for intelligent vehicle and highway research is slated to expire in 1997. Automakers are reluctant to invest in IVHS technology absent a long-term government commitment, but partnerships with suppliers, universities, government labs and each other are likely to increase as companies strive to create the next generation of vehicles in the most efficient ways possible.